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EXAMINER	
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ART UNIT	PAPER NUMBER
2877	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/863,128	DOTY ET AL.
	Examiner	Art Unit
	Gordon J. Stock	2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 July 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-3,5-20,22-31,33-42,47,48 and 50-52 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,5-20,22-31,33-42,47,48 and 50-52 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 22 May 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. New rejections under 35 U.S.C. 101 as well as new rejections under 35 U.S.C. 103(a) have been made. Subsequently, the final rejection (paper number 20060605) has been withdrawn. The following action is in response to the amendment received July 25, 2006, which has been entered into the record.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 'pair of electrodes wherein the length is greater than the width,' 'a solid semiconducting material disposed between said electrodes,' and 'wherein, the combination of electrodes and pi-conjugated material is rolled up along their length to form a generally cylindrical-shape structure' of claim 40; and 'said electrodes are composed of silicon wafers having prefabricated pulse detection circuitry patterned thereon' of claim 50 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. **Claim 24** is objected to for the following: being improperly dependent upon a limitation of claim 1, a pi-conjugated material, rather than 'a material for detecting ionizing radiation.' Examiner has interpreted claim 24 as depending from 'the material for detecting ionizing radiation of claim 1.' Correction is required.

4. **Claim 40** is objected to for the following: the pi-conjugated polymer of line 8 lacks antecedent basis. Examiner has interpreted this as 'pi-conjugated material' as mentioned in line 6. Correction is required.

5. **Claim 47** is objected to for the following: being improperly dependent upon a limitation of claims 12, 24, 35, 37, and 40, the material, rather than the detection device. Examiner has interpreted claim 47 as depending from claims 1 and 3. Correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. **Claims 41, 42, 51, and 52** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In **claims 41, 42, and 51** the particular exposing step (**claims 41 and 42**) and the particular detecting the signal step (**claim 51**) are

abstractions without a tangible result. Merely 'detecting/exposing' would not appear to be sufficient to constitute a tangible result, since the outcome of the detecting/exposing has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. See OG Notices: 22 November 2005, "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility".

Specifically: Part b. *Practical Application the Produces a Useful, Concrete, and Tangible Result* under Section IV *Determine Whether the Claimed Invention Complies with the Subject Matter Eligibility Requirement of 35 U.S.C. Sec. 101,* sentence 3, in the OG Notice from 22 November 2005 states 'In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible, and concrete."'

Claim 52 is rejected for being dependent upon a rejected base claim. In addition, the further limiting of the parent **claim 51** with the particular limitations of **claim 52** does not constitute a tangible result to overcome the rejection under 35 U.S.C. 101 above.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1-3, 7, 8, and 9** are rejected under 35 U.S.C. 102(b) as being anticipated by **Snavely (3,849,345)—previously cited.**

As for **claims 1-3, 7, 8, 9,** Snavely in conductive articles discloses a solid semiconductive material (col. 1, line 20) consisting essentially of a pi-conjugated material having an electrical resistivity of at least 1 gigaohm-cm, a composition of styrene, butadiene, and polystyrene; wherein the material has long chains of alternating single and double carbon-carbon bonds, butadiene-styrene copolymer mixed with organic polymers, block polystyrene (table 1; table 2; col. 4, lines 15-40).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claims 1, 3, 7, 10, 12-15, 18, 22, 24-26, 29, 33, 35-39, 41, 42, 51, 52** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)—previously cited.**

As for **claims, 1, 3, 7,** Bardash discloses in a solid state radiation detector a material comprising a solid organic semiconducting material consisting essentially of a pi-conjugated material having long chains of alternating single and double carbon-carbon bonds, polythiophene (Fig. 1: 7; col. 4, lines 50-55). As for the specific resistivity, Bardash does not explicitly disclose this. He suggests the film has at least 1 giga ohm-cm of resistitivity with the film being 1 to 5 microns in thickness (col. 4, lines 55-56) and an electrode area of 4 mm^2 (4E-2 cm^2 from 2mm * 2mm in Fig. 3) with the voltage being .1 to 100 volts (Fig. 4) and the current being 1.00 E-11 to 1.00E-08 (Fig. 4); wherein, the current at .1 volts is 1.00E-11 (Fig. 4); wherein, the resistivity is

at least 1.00E+10 ohm-cm (4.00E+12 ohm-cm) since voltage equals current times resistance and resistance equals resistivity times thickness of film divided by area of the electrode layer (at .1 volts and 1.00 E-11 current the resistance equals 1.00E+10 ohms and with a thickness of at least 1 micron the resistivity equals 1.00E+10 times (4E-2 cm^2)/1.0E-4 cm). Nevertheless, Butler in an organic metal neutron detector teaches having the organic material have at least 1 gigaohm cm of resistivity (Fig. 2: 4.8 x 10^10 ohm-cm) and to have a large resistivity in order to have greater sensitivity (col. 3, lines 15-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the resistivity be 10^12 ohm cm in order to have a greater sensitivity of 10^12 n/cm^2.

As for **claims 10, 22, 33,** Bardash in view of Butler discloses everything as above (see **claims 3, 15, and 26**). Bardash is silent concerning a metal incorporated into the pi-conjugated material. However, Butler in an organic metal neutron detector teaches incorporating boron into the structure in order to provide a good response to slow neutrons (col. 5, lines 40-50) and that thiophene detectors may be used as gamma ray and neutron radiation detectors (col. 3, lines 30-40 and line 65-67). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to incorporate boron into the pi-conjugated material in order to improve detector response to slow neutrons.

As for **claims 12-15, 18,** Bardash discloses in a device for detecting ionizing radiation: electrodes, wherein said electrodes are compositionally alike metals (col. 3, lines 40-45; col. 4, lines 30-35); a solid organic semiconducting material consisting essentially of a pi-conjugated material disposed between said electrodes through embedding into active polymeric layer of polythiophene (col. 3, lines 45-50; Fig. 1: 7; col. 4, lines 50-55); power supply means for

providing power to said electrodes, wherein said electrodes are disposed on the surface of the solid organic semiconducting material as a single layer (Fig. 1: 3, 7; Fig. 3: 29). As for the specific resistivity, Bardash does not explicitly disclose this. He suggests the film has at least 1 giga ohm-cm of resistitivity with the film being 1 to 5 microns in thickness (col. 4, lines 55-56) and an electrode area of 4 mm^2 (4E-2 cm^2 from 2mm * 2mm in Fig. 3) with the voltage being .1 to 100 volts (Fig. 4) and the current being 1.00 E-11 to 1.00E-08 (Fig. 4); wherein, the current at .1 volts is 1.00E-11 (Fig. 4); wherein, the resistivity is at least 1.00E+10 ohm-cm (4.00E+12 ohm-cm) since voltage equals current times resistance and resistance equals resistivity times thickness of film divided by area of the electrode layer (at .1 volts and 1.00 E-11 current the resistance equals 1.00E+10 ohms and with a thickness of at least 1 micron the resistivity equals 1.00E+10 times (4E-2 cm^2)/1.0E-4 cm). Nevertheless, Butler in an organic metal neutron detector teaches having the organic material have at least 1 gigaohm cm of resistivity (Fig. 2: 4.8 x 10^10 ohm-cm) and to have a large resistivity in order to have greater sensitivity (col. 3, lines 15-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the resistivity be 10^12 ohm cm in order to have a greater sensitivity of 10^12 n/cm^2.

As for **claims 24-26, 29,** Bardash in view of Butler discloses everything as above (see **claim 1**). In addition, Bardash discloses electrodes are compositionally alike metals (col. 3, lines 40-45; col. 4, lines 30-35); the material of **claim 1** disposed between said electrodes through embedding into active polymeric layer of polythiophene, a pi-conjugated polymer (col. 3, lines 45-50; Fig. 1: 7; col. 4, lines 50-55); power supply means for providing power to said electrodes,

wherein said electrodes are disposed on the surface of the solid organic semiconducting material as a single layer (Fig. 1: 3, 7; Fig. 3: 29).

As for **claims 35 and 36,** Bardash in view of Butler discloses the material of **claim 1** (see **claim 1** above). In addition, Bardash discloses an array of wires embedded in the material of claim 1 (Fig. 2; col. 3, lines 45-50); the array comprising a first set of parallel wires intersecting orthogonally with a second set of parallel wires (Fig. 3: 19, 21, 15 , 17); means for supplying power to each array (Fig. 3: 29).; with wires spaced at a distance of from 10 microns to 100 microns apart (col. 3, lines 64-65).

As for **claims 37-38**, Bardash in view of Butler discloses the material of **claim 1** (see **claim 1** above). In addition, Bardash discloses a plurality of layers joined together to form a multilayer stack, wherein each layer comprises an array of wires embedded in the material of claim 1 (Fig. 2; col. 3, lines 45-50); the array comprising a first set of parallel wires intersecting orthogonally with a second set of parallel wires (Fig. 3: 19, 21, 15 , 17); means for supplying power to each array (Fig. 3: 29).; with wires spaced at a distance of from 10 microns to 100 microns apart (col. 3, lines 64-65).

As for **claim 39**, Bardash discloses: electrodes (Fig. 2: 3); a pi-conjugated polymer, polythiophene, disposed between said electrodes (col. 3, lines 45-50; Fig. 1: 7; col. 4, lines 50-55), wherein said pi-conjugated polymer has C:H ratio and density substantially equal to that of human skin (col. 4, lines 62-68; col. 5, lines 1-5); wherein said electrodes are disposed on the surface of the pi-conjugated polymer as a single layer (Fig. 2: 3; Fig. 1: 3, 7). As for the specific resistivity, Bardash does not explicitly disclose this. He suggests the film has at least 1 giga ohm-cm of resistitivity with the film being 1 to 5 microns in thickness (col. 4, lines 55-56) and

an electrode area of 4 mm^2 (4E-2 cm^2 from 2mm * 2mm in Fig. 3) with the voltage being .1 to 100 volts (Fig. 4) and the current being 1.00 E-11 to 1.00E-08 (Fig. 4); wherein, the current at .1 volts is 1.00E-11 (Fig. 4); wherein, the resistivity is at least 1.00E+10 ohm-cm (4.00E+12 ohm-cm) since voltage equals current times resistance and resistance equals resistivity times thickness of film divided by area of the electrode layer (at .1 volts and 1.00 E-11 current the resistance equals 1.00E+10 ohms and with a thickness of at least 1 micron the resistivity equals 1.00E+10 times (4E-2 cm^2)/1.0E-4 cm). Nevertheless, Butler in an organic metal neutron detector teaches having the organic material have at least 1 gigaohm cm of resistivity (Fig. 2: 4.8 x 10^10 ohm-cm) and to have a large resistivity in order to have greater sensitivity (col. 3, lines 15-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the resistivity be 10^12 ohm cm in order to have a greater sensitivity of 10^12 n/cm^2.

As for **claim 41**, Bardash discloses: providing a device comprising a pi-conjugated polymer, polythiophene, disposed between an array of electrodes through embedding (Fig. 1: 3, 7); the electrodes are compositionally alike (col. 3, lines 40-45; col. 4, lines 30-35); applying power to the electrodes to produce an electric field within the pi-conjugated polymer (Fig. 3: 29); exposing the device to ionizing radiation (col. 5, lines 10-15). As for the specific resistivity, Bardash does not explicitly disclose this. He suggests the film has at least 1 giga ohm-cm of resistitivity with the film being 1 to 5 microns in thickness (col. 4, lines 55-56) and an electrode area of 4 mm^2 (4E-2 cm^2 from 2mm * 2mm in Fig. 3) with the voltage being .1 to 100 volts (Fig. 4) and the current being 1.00 E-11 to 1.00E-08 (Fig. 4); wherein, the current at .1 volts is 1.00E-11 (Fig. 4); wherein, the resistivity is at least 1.00E+10 ohm-cm (4.00E+12 ohm-cm) since

voltage equals current times resistance and resistance equals resistivity times thickness of film divided by area of the electrode layer (at .1 volts and 1.00 E-11 current the resistance equals 1.00E+10 ohms and with a thickness of at least 1 micron the resistivity equals 1.00E+10 times (4E-2 cm^2)/1.0E-4 cm). Nevertheless, Butler in an organic metal neutron detector teaches having the organic material have at least 1 gigaohm cm of resistivity (Fig. 2: 4.8 x 10^10 ohm-cm) and to have a large resistivity in order to have greater sensitivity (col. 3, lines 15-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the resistivity be 10^12 ohm cm in order to have a greater sensitivity of 10^12 n/cm^2.

As for exposing the device to neutron radiation, Bardash is silent. However, Butler teaches that thiophene detectors may be used as gamma ray and neutron radiation detectors (col. 3, lines 30-40 and line 65-67). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was that the device would be exposed to neutron radiation, for the device detects ionizing radiation as well as neutron radiation.

As for **claim 42**, Bardash discloses: providing a device comprising a pi-conjugated polymer, polythiophene, disposed between an array of electrodes through embedding (Fig. 1: 3, 7); the electrodes are compositionally alike (col. 3, lines 40-45; col. 4, lines 30-35); applying power to the electrodes to produce an electric field within the pi-conjugated polymer (Fig. 3: 29); exposing the device to ionizing radiation (col. 5, lines 10-15). As for the specific resistivity, Bardash does not explicitly disclose this. He suggests the film has at least 1 giga ohm-cm of resistitivity with the film being 1 to 5 microns in thickness (col. 4, lines 55-56) and an electrode area of 4 mm^2 (4E-2 cm^2 from 2mm * 2mm in Fig. 3) with the voltage being .1 to 100 volts (Fig. 4) and the current being 1.00 E-11 to 1.00E-08 (Fig. 4); wherein, the current at .1 volts is 1.00E-

11 (Fig. 4); wherein, the resistivity is at least 1.00E+10 ohm-cm (4.00E+12 ohm-cm) since voltage equals current times resistance and resistance equals resistivity times thickness of film divided by area of the electrode layer (at .1 volts and 1.00 E-11 current the resistance equals 1.00E+10 ohms and with a thickness of at least 1 micron the resistivity equals 1.00E+10 times (4E-2 cm^2)/1.0E-4 cm). Nevertheless, Butler in an organic metal neutron detector teaches having the organic material have at least 1 gigaohm cm of resistivity (Fig. 2: 4.8 x 10^10 ohm-cm) and to have a large resistivity in order to have greater sensitivity (col. 3, lines 15-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the resistivity be 10^12 ohm cm in order to have a greater sensitivity of 10^12 n/cm^2.

As for **claims 51 and 52**, Bardash in view of Butler discloses everything as above (see **claim 1**). In addition, Bardash discloses providing an array of wires embedded in the polythiophene layer comprising a first set of parallel spaced apart wires intersecting orthogonally with a second set of parallel spaced apart wires (Figs. 2 and 3: 3, 17, 19, 21, 15); supplying electric power to the array (Fig. 3: 29); inserting the array into a radiation field and detecting the signal generated when radiation strikes the wires (col. 5, lines 10-20); wherein the array is a multilayer array (Fig. 2: 3; Fig. 1: 3, 5, 7).

12. **Claims 2, 8, 9, 19, 20, 30, 31,** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)—previously cited** further in view of **Selph (4,445,036)—previously cited** and **Snavely (3,849,345)—previously cited.**

As for **claims 2, 8, 9, 19, 20, 30 and 31** Bardash in view of Butler discloses everything as above (see **claims 1, 3, 15, and 26**). Bardash is silent concerning a mixture of pi-conjugated

materials or mixing with organic polymers; however, Butler in an organic metal neutron detector teaches that any organic material with a high resistivity can be used for radiation detection (col. 3, lines 15-20) and that polythiophene and polypyrrole are functional equivalents (col. 3, lines 65-67; col. 4, lines 1-3); wherein, due to the properties of the organic film used both neutron radiation and ionizing radiation may be detected (col. 3, lines 30-42). As well Selph teaches that a polypyrrole detector is used for both neutron radiation detection and dosimetry (col. 4, lines 50-65). And Snavely teaches a mixture, a composition of styrene, butadiene, and polystyrene; wherein the material has long chains of alternating single and double carbon-carbon bonds, butadiene-styrene copolymer mixed with organic polymers, block polystyrene with high resistivity (table 1; table 2; col. 4, lines 15-40). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the material comprise a butadiene-styrene copolymer mixed with a block polystyrene in order to provide a high resistivity for maximum sensitivity in neutron detection/dosimetry.

In addition, applicant discloses the equivalence of polythiophene with combinations of pi-conjugated polymers as stated in the Markush group claim 5 as originally filed by applicant and therefore shows that a mixture of pi-conjugate materials or mixture of pi-conjugated polymers is an equivalent structure known in the art. Therefore, because these two were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute polythiophene for a mixture of pi-conjugated materials or a mixture of pi-conjugated polymers.

13. **Claims 5, 6, 16, 17, 27, 28,** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)—previously cited** further in view of **Selph (4,445,036)—previously cited.**

As for **claims 5, 6, 16, 17, 27, 28,** Bardash in view of Butler discloses everything as above (see **claims 3, 15, and 26**). However, Bardash is silent concerning polypyrroles and/or polyacetylenes. However, Butler in an organic metal neutron detector teaches that any organic material with a high resistivity can be used for radiation detection (col. 3, lines 15-20) and that polythiophene and polypyrrole are functional equivalents (col. 3, lines 65-67; col. 4, lines 1-3); wherein, due to the properties of the organic film used both neutron radiation and ionizing radiation may be detected (col. 3, lines 30-42). As well Selph teaches that a polypyrrole detector is used for both neutron radiation detection and dosimetry and that polyacetylenes and polypyrroles are functional equivalents (col. 4, lines 50-65). Therefore, because polythiophene, polypyrroles, and polyacetylenes were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute polythiophene for polypyrrole or polyacetylene.

In addition, applicant discloses the equivalence of polythiophene with polyacetylenes and polypyrroles as stated in the Markush group claim 5 as originally filed by applicant. Therefore, because polythiophene, polypyrroles, and polyacetylenes were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute polythiophene for polypyrrole or polyacetylene.

14. **Claims 11, 23, and 34,** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)-previously cited** further in view of **Smith et al. (3,824,220)—previously cited.**

As for **claims 11, 23, and 34,** Bardash in view of Butler discloses everything as above (see **claims 10, 22, and 33**). In addition, boron is incorporated in the form of BF_4- (Butler: col. 5, line 45). Butler does not mention a boronic acid. However, Smith teaches that BF_4- termination in a polymers from a strong acid (col. 1, lines 10-20; col. 5, lines 1-5). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that a boronic acid was used to incorporate BF_4- into the pi-conjugated material for a strong Lewis acid, BF_3, is used to react with polymers to form the anion.

15. **Claim 40** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishizawa et al. (5,907,156)** in view of **Butler et al. (4,641,037)-previously cited.**

As for **claim 40,** Nishizawa in a wide range radiation detector discloses the following: a pair of electrodes, each having a length and width, wherein the length is greater than the width (Fig. 14: 203 and Fig. 20 with cylindrical electrodes; col. 14, lines 55-60); a solid semiconducting material disposed between said electrodes and rolled up along their length to form a generally cylindrical-shape structure (Fig. 20 with cylindrical electrodes and coaxial semiconductive cylinders; col. 14, lines 53-60); means for providing power to said electrodes (Fig. 18: 204). As for the semiconducting material being organic essentially of a pi-conjugated material having an electrical resistivity of at least 1 gigaohm cm, Nishizawa is silent. However, Butler teaches that thiophene detectors may be used as gamma ray and neutron radiation detectors (col. 3, lines 30-40 and line 65-67); wherein, high resistivity gives greater sensitivity

(col. 3, lines 15-20) that are semiconductive (col. 2, lines 45-50) which may be cylindrical (col. 4, lines 4-10). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the semiconductor material comprise an organic pi-conjugated material with at least a resistivity of 1 gigaohm cm such as 10^12 ohm chm in order to have greater sensitivity to lower neutron or ionizing radiation flux.

16. **Claim 47** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)-previously cited** in view of **Taylor (2,321,635).**

As for **claim 47**, Bardash in view of Butler discloses everything as above (see **claims 1 and 3**). In addition, Bardash discloses an external stress, a voltage, is applied to orient the polymer chains at a temperature above glass transition and below melting temperature, the casting temperature for crystalline structure formation (col. 5, lines 1-10). Bardash is silent concerning the external stress stretches to strain and orient the polymer chains. However, Taylor teaches using a tensile stress to elongate the polymer for film formation which increases stiffness and decreases sensitivity to distortion (col. 1, lines 10-25). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have an external stress applied to stretch and orient the polymer to increase rigidity and decrease sensitivity to distortion upon film formation.

17. **Claim 47** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Snavely (3,849,345)—previously cited** in view of **Taylor (2,321,635).**

As for **claim 47**, Snavely discloses everything as above (see **claims 1and 3**). In addition, Snavely is silent concerning an external stress, yet he suggests it for films are formed (col. 3,

lines 20-21). However, Taylor teaches using a tensile stress to elongate the polymer for film formation which increases stiffness and decreases sensitivity to distortion (col. 1, lines 10-25). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have an external stress applied to stretch and orient the polymer to increase rigidity and decrease sensitivity to distortion upon film formation.

18. **Claim 48** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)-previously cited** in view of **Taylor (2,321,635)** further in view of **Dunnington et al. (3,354,023).**

As for **claim 48**, Bardash in view of Butler and Taylor discloses everything as above (see **claim 47**). In addition, Taylor has the stress performed below melting temperature (col. 1,line 17). They are silent concerning having it above glass transition temperature. However, Dunnington teaches in a method of orienting polymers providing stress above glass temperature to provide sufficient strength in crystalline form (col. 4, lines 5-15). Therefore, it would be obvious to one of ordinary skill in the art at the time to provide an external stress above glass transition temperature in order to form stronger films in crystalline form.

19. **Claim 48** is rejected under 35 U.S.C. 103(a) as being unpatentable **over Snavely (3,849,345)—previously cited** in view of **Taylor (2,321,635)** further in view of **Dunnington et al. (3,354,023).**

As for **claim 48**, Snavely in view of Taylor discloses everything as above (see **claim 47**). In addition, Taylor has the stress performed below melting temperature (col. 1,line 17). They are silent concerning having it above glass transition temperature. However, Dunnington teaches in a method of orienting polymers providing stress above glass temperature to provide sufficient

strength in crystalline form (col. 4, lines 5-15). Therefore, it would be obvious to one of ordinary skill in the art at the time to provide an external stress above glass transition temperature in order to form stronger films in crystalline form.

20. **Claim 50** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Bardash (6,278,117)—cited by applicant** in view of **Butler et al. (4,641,037)-previously cited** further in view of **Robinson et al. (5,500,534)-previously cited.**

As for **claim 50**, Bardash in view of Butler discloses everything as above (see **claim 1**). In addition, Bardash discloses the following: electrodes, wherein electrodes have prefabricated pulse detection circuitry patterned thereon (col. 3, lines 40-45; col. 4, lines 20-40); the material of claim 1 disposed between the electrodes (Fig. 1: 3, 7); power supply means for providing power to said electrodes (Fig. 3: 29). However, he is silent concerning the electrodes are composed of silicon wafers; Bardash does disclose the circuitry patterned on a polyimide layer (col. 4, lines 14-16). However, Robinson in a radiation detection system teaches that polyimide layers are disposed on silicon wafers (col. 13, lines 20-30). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the electrodes were composed of silicon wafers in order to support the polyimide layer during the microelectronic devices fabrication.

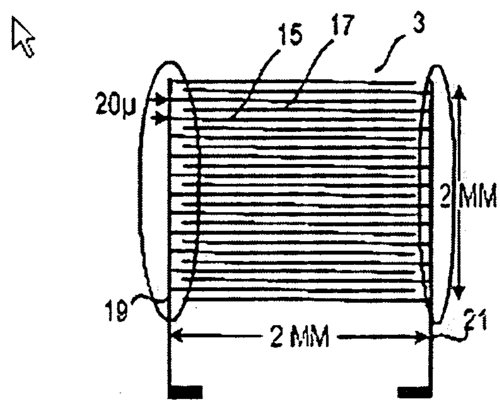
Response to Arguments

21. Applicant's arguments with respect to **claims 1, 3, 7, 12-15, 18, 24-26, 29, 35-39, 42, 47, 48, 51, and 52** and the rejection under 35 U.S.C. 102(e) with **Bardash (6,278,117)** and **claims 2, 5, 6, 8, 9, 10, 11, 16, 17, 19, 20, 22, 23, 27, 28, 30, 31, 33, 34, 41, 50,** under 35 U.S.C. 103(a)

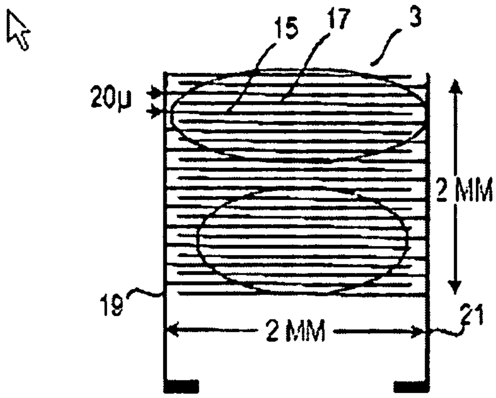
with **Bardash (6,278,117)** in view of other references and **claim 40** under 35 U.S.C. 103(a) have been considered but are moot in view of the new ground(s) of rejection.

However, Examiner will address arguments concerning claims 35-38 and claims 51-52 on page 11 of Remarks filed on July 25, 2006.

In regards to the arguments of **claims 35-38** and claims 51-52 on page 11, Examiner disagrees that Bardash does not disclose an array of wires embedded in a pi-conjugated material, the array comprises a first set of parallel spaced apart wires intersecting orthogonally with a second set of parallel spaced apart wires' because Bardash discloses interdigitated conductor lines. Bardash discloses a first set of parallel spaced apart vertical wires in Fig. 3 (circled portions):



that intersect orthogonally with a second set of parallel spaced apart horizontal wires in Fig. 3 (circled portions):



An orthogonal arrangement does not preclude an interdigital orientation comprising an array of two vertical electrodes with an array comprising a plurality of horizontal electrodes.

Applicant's arguments filed July 25, 2006 in regards to claims 1-3, 7-9 being rejected under 35 U.S.C. 102(b) with Snavely (3,848,345) have been fully considered but they are not persuasive. In regards to the arguments concerning **claims 1-3, 7-9** and Snavely (3,849,345) on page 12 of Remarks that Snavely teaches a mixture of materials and not the claimed material, Examiner disagrees. The applicant states that Snavely has a material comprising a compounding recipe and the pi-conjugated material. Examiner agrees. The pi-conjugated material has a resistivity above 1 gigaohm cm. See Table II below.

TABLE II

Copolymer	Block poly-styrene	Resistivity, ohm-cm.	
		0 phr. CB	40 phr. CB
A	10	5.2×10^{13}	4.0×10^{6}
B	84	4.9×10^{14}	5.0×10^{5}
C	17	4.5×10^{14}	3.8×10^{5}
D	0	4.5×10^{14}	1.7×10^{14}

However, claim 1 recites 'a material for detecting ionizing radiation, comprising a solid organic semiconducting material consisting essentially of a pi-conjugated material having an electrical resisitivity of at least 1 gigaohm-cm.' Snavely's compounding recipe essentially

consists of a pi-conjugated material for the polymer comprises 100 parts of 111 parts of the compounding recipe. In addition, 'a material comprising a solid organic semiconducting material consisting essentially of a pi-conjugated material' does not preclude a material comprising a solid organic semiconducting material consisting essentially of a pi-conjugated material having the particular resistivity and comprising other compounding ingredients.

Examiner apologizes for the inconvenience but upon further consideration a rejection under 35 U.S.C. 101 was made as well as objections to the drawings. As for the Remarks concerning **claims 47-48** with 35 U.S.C. 112 second paragraph, though the amendment to the claims has overcome the rejection under 35 U.S.C. 112 second paragraph, an objection to the claims has been made. See above.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(571) 273-8300**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs
August 17 2006

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